Division of Solid Waste Management
Toxic Substances Program

Laboratory Services Contract Requirements

Date: October 23, 2019

The Toxic Substances Program conducts sampling that requires the contract services of a third party laboratory. The following sections describe the specifications for laboratory accreditation/certification, quality assurance/quality control, sample matrixes, laboratory provided supplies, quality assurance and quality control (QA/QC) data packages, data reporting requirements and the estimated analyses required per year. The overall objective of this contract for services is to generate analytical data of known and legally defensible quality. The laboratory selected must have and maintain all of the following laboratory certifications and accreditations:

1. National Lead Laboratory Accreditation Program (NLLAP) for the analysis of lead in dust-wipes, soils, paint chips and complex matrices or equivalent.

2. National Institute of Standards and Technology(NIST) National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the analysis of asbestos by PLM and TEM or equivalent.

3. A State certification for the analysis of lead in drinking water. The laboratory selected under these specifications may use a third party to conduct drinking water analyses.

Samples submitted to the third party laboratory under this contract for services, require analytical testing for:

1. Lead in dust-wipes, soil, paint chips and water
2. Asbestos in dust wipes, bulk and air monitoring cassettes
3. Polychlorinated biphenyls in oil, wipes, water, soil and complex matrices
4. Lead in food products

The required turnaround time for <u>all samples</u> (lead, asbestos, PCB's and food prodicts) is:

- Standard – 5 days
- Non-standard – 24 hours, 48 hours, and 72 hours

A. LEAD (Pb) Analyses

i. Laboratory Accreditations

Samples will be analyzed by a laboratory recognized by EPA pursuant to section 405(b) of TSCA as being capable of performing analyses for lead. The laboratory must be a fixed-site that is recognized by the National Lead Laboratory Accreditation Program (NLLAP). The laboratory must successfully participate in the Environmental Lead Proficiency Analytical Testing (ELPAT) Program, meet the Laboratory Quality System Requirements, Revision 3.0 (LQSR), 5.4.3.1 Standard Operating Procedures (SOPs), (page 23 of the NLLAP LQSR) and undergo a systems audit.

If a laboratory does not have accreditation for water analysis in the state of Tennessee, the laboratory may outsource the analysis for lead in water samples to a laboratory with an equivalent accreditation as long as the original time frame for sample results is maintained.

ii Analytical Method(s) QA/QC:

- All laboratory QA/QC will be conducted pursuant to the LABORATORY QUALITY SYSTEM REQUIREMENTS (LQSR) REVISION 3.0 (November 05, 2007) (LQSR) attached in Appendix 1.
- The laboratory will test, calibrate, inspect and maintain instruments and equipment pursuant to the LQSR.
- The laboratory will ensure that the data is managed pursuant to the LQSR.
- The laboratory will review, verify, and validate the data pursuant to the LQSR.
- The laboratory will review data to ensure that all surrogate recoveries for spiked standards are within 80% to 120% of the true known standard concentration.
- The laboratory shall provide, before the expiration date, annual proof of NLLAP accreditation renewal, recent laboratory audits and results, recent proficiency testing and results.

The laboratory must maintain the instrumental accuracy to detect lead in paint chips, soil and dust-wipes that is equal to or lesser than the lead hazard standard levels (40 CFR 745 Subpart D) in effect at the time of sample submission.

Current lead hazard levels are:

- Paint chip: 0.5% by weight or 1.0 mg/cm^2

- Soil: 400 ppm or µg/g or mg/kg
- Dust wipe - floor: 10 µg/ft²
- Dust wipe - sill: 200 µg/ft²

The laboratory must maintain the instrumental accuracy to detect concentrations of lead in drinking water samples that or equal to or lesser than the action level of 0.015 mg/L. Laboratories must:

- Be certified by EPA or the state to analyze drinking water samples for compliance monitoring
- Successfully analyze proficiency testing (PT) samples at least annually for each method and analyte for which they desire certification
- Use approved methods
- Pass periodic on-site audits

iii Analytical data reporting requirements

Laboratory analytical results must be sent to the designated TDEC program coordinator by email, postal mail or carrier as requested. The approximate annual number of distinct samples per matrix submitted to the laboratory for contract analyses is:

- Lead - Dust Wipe Samples ~750
- Lead - Soil Samples ~ 225
- Lead - Water Samples ~ 100
- Lead - Food Samples ~ 10
- Lead – Paint Chips ~ 50

iv. Sampling supplies provided to TDEC by the laboratory

- Laboratory matrix spikes for lead dust wipes to support sixty field testing events. The TDEC coordinator will request the matrix spike standards.
- centrifuge tubes
- surgical grade ghost wipes
- drinking water sample bottles

B. Asbestos Analyses

i. Laboratory Accreditations and QA/QC

The laboratory selected under this contract for services shall be and maintain accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) and abide by the quality objectives and criteria set forth in the

National Institute of Standards and Technology (NIST) Handbook 150, NVLAP Procedures and General Requirements, Subsection 285.33; NIST Handbook 150-3 and 150-13; and ASTM D6480-05: Standard Test Method for Wipe Sampling of Surfaces, Indirect Preparation and Analysis for Asbestos Structure Number Concentration by Transmission Electron Microscopy.

ii Analytical Method(s) QA/QC:

- All laboratory quality control will be conducted pursuant to the NIST NVLAP requirements.
- The laboratory will test, calibrate, inspect and maintain instruments and equipment pursuant to the NIST NVLAP.
- The laboratory will ensure that the data is managed pursuant to the NIST NVLAP.
- The laboratory will review, verify, and validate the pursuant to the NIST NVLAP.
- The Laboratory shall provide annually, proof of NIST NVLAP accreditation renewal, recent laboratory audits and results, recent proficiency testing and results.

iii Analytical data reporting requirements:

Analytical results will be sent to the TDEC coordinator by email, postal mail or carrier service as requested.

iv. Approximate annual number of distinct samples per matrix for contract laboratory analysis is:

- Asbestos – Clearance Wipes ~ 25
- Asbestos – Bulk Samples ~ 25
- Asbestos – Clearance Air Filters ~ 25

C. Polychlorinated Biphenyls (PCBs) Analysis

i. Laboratory Analytical Method(s), Precision and Control limits
The following analytical methods shall be used to analyze for PCB congeners in sample matrices submitted.

(1) USEPA Region 4 Data Validation Standard Operating Procedures for Contract Laboratory Program (CLP) Routine Analytical Services. (https://www.epa.gov/quality/epa-region-4-data-validation-standard-operating-procedures-contract-laboratory-program)

(2) USEPA REGION 4 Data Validation Standard Operating Procedures for Contract Laboratory Program Organic Data Using Gas Chromatograph / Mass Spectrometer and Gas Chromatograph / Electron Capture Detector. (https://www.epa.gov/sites/production/files/2018-01/documents/qas-sop-0025_data_validation_for_clp_organics.pdf)

ii. Detection limits, quantitation limits, control limits, spikes, surrogates and percentage recovery

Analytical QA/QC shall be established and maintained as specified in the following documentation:

(1) Method 8082 – See Section 8.0 and Method 8000 Section 8.0

(2) Contract Laboratory Program Statement for Organic Work SOM01.1 including Appendix D and SOM02.0 - See Section 9.0 – Section 13.0 and Section 17.0 Table 1

(3) PCBs in Transformer Fluid and Waste Oil EPA-600/4-81-045 – See Section 1.3, Section 5.0 and Section 10.0 – See Section 9.0, Section 15.0, and Section 23.0 Table 2

Other critical parameters:

The Laboratory must specify the minimum quantity for analysis of samples. For example, the laboratory can analyze samples as long as a minimum percentage of the method recommended volume is submitted.This is important when only a small volume of a sample can be obtainedand multiple analyses are requested.

iii. Quality Assurance and Quality Control Data Packages

The laboratory will review, verify, and validate the data pursuant to the standards outlined by the CLP data review process, and/or analytical method. The cost and types of available data validation packages shall be included in the schedule of contract services. QA/QC data packages will be requested by the TDEC coordinator as needed.

iv. Analytical data reporting requirements

To date, there are no laboratory accreditation protocols for conducting analyses of PCBs to determine compliance with the regulations outlined in 40 CFR Part 761.To ensure that all data is of known quality, samples will be analyzed by a third-party laboratory that is in compliance with TSCA Section

2603 and 40 CFR Part 792- Good Laboratory Practices . The third-party laboratory must also have an established quality assurance and quality control program such that it maintains accreditation with the National Environmental Laboratory Accreditation Program's (NELAP).

Sample results must be reported in units required by 40 CFR 761.1(b) (2) and (b) (4).

> (1) Unless otherwise noted, PCB concentrations shall be determined on a weight-per-weight basis (e.g., milligrams per kilogram), or for liquids, on a weight-per-volume basis (e.g., milligrams per liter) if the density of the liquid is also reported. Unless otherwise provided, PCBs are quantified based on the formulation of PCBs present in the material analyzed. For example, measure Aroclor 1242 PCBs based on a comparison with Aroclor 1242 standards. Measure individual congener PCBs based on a comparison with individual PCB congener standards.
>
> (2) PCBs can be found in liquid, non-liquid and multi-phasic (combinations of liquid and non-liquid) forms that is also commonly referred to as 'complex matrices'. A person should use the following criteria to determine PCB concentrations to determine which provisions of this part apply to such PCBs.
>
> > (i) Any person determining PCB concentrations for non-liquid PCBs must do so, on a dry weight basis.
> >
> > (ii) Any person determining PCB concentrations for liquid PCBs must do so, on a wet weight basis. Liquid PCBs containing more than 0.5 percent by weight non-dissolved material shall be analyzed as multi-phasic non-liquid/liquid mixtures.
> >
> > (iii) Any person determining the PCB concentration of samples containing PCBs and non-dissolved non-liquid materials ≥0.5 percent must separate the non-dissolved materials into non-liquid PCBs and liquid PCBs. For multi-phasic non-liquid/liquid or liquid/liquid mixtures, the phases shall be separated before chemical analysis. Following phase separation, the PCB concentration in each non-liquid phase shall be determined on a dry weight basis and the PCB concentration in each liquid phase shall be determined separately on a wet weight basis.

v. Approximate annual number of distinct samples per matrix for contract laboratory analysis:

Wipe/Wipe Blanks/Duplicate (13 sets of 3 samples plus one blank for each set)	6
Soil/solids	6
Oil	25

Water	12
Complex Matrix	6

vi. Sampling supplies provided by laboratory to TDEC and as requested by the TDEC coordinator:

- Wipe media consisting of surgical/pharmaceutical or commercial grade gauze pads (4" x4")
- Glass jars/bottles for samples equipped with polytetrafluoroethylene (PTFE) or Teflon screw-cap liners.
- Dust-wipe centrifuge tubes
- 1-ft^2 non-porous square template for dust sampling

ESTIMATED ANNUAL QUANTITY	SUPPLIES	$/UNIT	TOTAL COST
1,200	50-ml centrifuge tubes	$0.01	$ 12.00
1,200	Plastic sealable bags	$0.01	$ 12.00
2,000	ASTM Ghost lead wipes	$0.01	$ 20.00
100	PCB sample bottles	$0.01	$ 1.00
50	PCB glass sample jars	$0.01	$ 0.50
50	Lead Blind Standards	$5.00	$ 250.00
	TOTAL ESTIMATED SUPPLIES COST		$ 295.50

vii. Other critical parameters:

The laboratory must specify the cutoff for samples not meeting volume requirements. For example, the laboratory can analyze samples as long as a minimum percentage of the method recommended volume is submitted. This is important for instances when only a small volume of a sample can be obtained and multiple analyses are requested.

PCB Analysis General Method Requirements

a. <u>SW-846 Method 8082</u> (applicable to aqueous and solid samples)

Matrix and Constituent	Method Detection Limit (MDL)
Aroclors – water	0.054 - 0.90 µg/L
Aroclors – soil	57 - 70 µg/kg
Congeners – water	5 - 25 ng/L
Congeners – soil	160 - 800 ng/kg
Quality Control Reference PCB Sample Frequency	1/20 samples analyzed or 1/batch

Quality Control Reference PCB Sample Recovery	80 - 120%
Calibration Standard Frequency	1/20 samples (or more frequent)
Method Recovery (performance studies)	80 – 90 %

b. <u>CLP Appendix D</u> (applicable to aqueous, soil and sediment samples)

Method Detection Limit (MDL)	CQRL - 10^6 x CQRL (Contract Required Detection Limit-CQRL)
Method Blank	1/20 samples extracted (CLP Appendix D, continued)
Instrument Blank	every 12 hours
MS/MSD	1/20 samples of similar matrix
Surrogate Recovery (DCB, TMX)	30 – 150 %

c. <u>PCBs in Transformer Fluid and Waste Oil EPA-600/4-81-045</u> (applicable to dielectric oil and waste oil)

Method Detection Limit (MDL)	1 mg/kg (for Aroclor 1221, 1242, 1254, 260)
Quality Control Check	Quarterly
MS/MSD	10% of all samples
Other QA/QC parameters	Refer to Method

D. Food Product Analysis

The lab should be capable of detecting the 0.1 part per million (ppm) recommended maximum lead level in candy and the 50 parts per billion (ppb) recommended maximum lead level in juice as established by the FDA. The laboratory selected under these specifications may use a third party to conduct food product analysis.

- If the lab does not do performance testing on food products, they may subcontract to another lab provided it has the required certification and as long as the requested turnaround time is maintained.

- Food product samples must be tested using ICP analysis.

E. Other Performance Requirements

LEAD ANALYSES	Dust Wipes and Soil samples	Paint Chip samples	Water Samples	Food samples
Analytical Method(s), precision and control limits	Dust: 10 ug/ft² Soil: 400 ppm (ug/g) (mg/kg)	Paint chip: 0.5% by weight or 1.0 mg/cm²	Water: 15 ppb	Food: 0.1 ppm
Turn- around time	5- day	5- day	5- day	
Sampling supplies Provided under this contract	Plastic Bags – large QA/QC Blind Standards Clean centrifuge tubes Ghost wipes Gloves	Plastic Bags – large Clean centrifuge tubes	Plastic Bags – large 32 oz. Water Bottles with preservative	
Quality Assurance and Quality Control Data Packages required	1-field blank, 1-blind standard, 1-surrogate recovery per sampling event. Provide QA/QC data package every six months	Provide QA/QC data package every six months	Provide QA/QC data package every six months	
Laboratory accreditations	National Lead Laboratory Accreditation Program	National Lead Laboratory Accreditation Program	Be certified by EPA or the state to analyze drinking water samples for compliance monitoring	
Transmission Electronic Microscopy (TEM) – Asbestos Analysis	**Dust Wipe Clearance**			
Analytical Method(s), precision and control limits	Transmission Electron Microscopy Wipe – ASTM D 6480			
Turn- around time	5 – Day Turn Around			
Sampling supplies provided under this contract	Sample Tube; Plastic bags; dust-wipe			
Quality Assurance and Quality Control Data Packages required	1-field blank per sampling event Provide QA/QC data package every six months			
Detection limits, quantitation limits	2.99 X calculated asbestos structures/cm²			
Analytical data reporting	Structures/ cm²			
Laboratory accreditations, recent laboratory audits and results and recent proficiency testing	National Institute of Standards and Technology's and National Voluntary Laboratory Accreditation Program			

PCM - Asbestos Analysis				
Analytical Method(s), precision and control limits	National institute for Occupational Safety and Health (NIOSH) Method 7400 entitled “Fibers” published in the NIOSH Manual of Analytical methods, 3rd Edition, Second Supplement, August 1987			
Turn- around time	5-day turnaround			
Sampling supplies	PCM air sampling cassettes			
Quality Assurance and Quality Control Data Packages required	Field blank - 10% of samples will be field blanks, or a minimum of 1 field blank per shipment when less than 10 samples. Provide QA/QC data package every six months			
Detection limits, quantitation limits, control limits, spikes, surrogates and percentage recovery	Detection limit is 7 f/mm2 (0.002f/cc with 1200 liters sample volume)			
Analytical data reporting requirements	Fibers per cubic centimeter			
Laboratory accreditations, recent laboratory audits and results, recent proficiency testing and results	Participate in the American Industrials Hygiene Association Proficiency Analytical Testing Program.			
PLM - Asbestos Analysis				

Analytical Method(s), precision and control limits	PLM EPA/600/R-93/116; Method For The Determination Of Asbestos In Bulk Building Materials			
Turn- around time	5-day turnaround			
Sampling supplies	Sample Tubes			
Quality Assurance and Quality Control Data Packages required	No blanks will be collected for bulk samples of material; at least 1 cubic inch of material for surfacing material, miscellaneous material and/or thermal pipe insulation will be collected and sent to the laboratory for analysis. Provide QA/QC data package every six months.			
6. Detection limits, quantitation limits, control limits, spikes, surrogates and percentage recovery	The upper detection limit is 100 percent. The lower detection limit is “less than 1 percent”.			
Analytical data reporting requirements	% composition by volume			
Laboratory accreditations, recent laboratory audits and results, recent proficiency testing and results	Accredited by the National Institute of Standards and Technology’s National Voluntary Laboratory Accreditation Program			

October 26, 2021 amendments:

The laboratory must have certification from any state to conduct the analysis of lead in drinking water. The laboratory selected under these specifications may use a third party to conduct drinking water or lead in food analyses.

Appendix 1

EPA NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM
LABORATORY QUALITY SYSTEM REQUIREMENTS
(LQSR) REVISION 3.0 (November 05, 2007)